

# Calc Q4 T2 Review Key

$$1) \int_0^1 (0 - (x^2 - 1)) dx + \int_1^2 (x^2 - 1 - 0) dx = \boxed{2}$$

$$2) \int_0^{.877} (\sin(x) - x^2) dx \quad \text{Area} = \boxed{.136}$$

$$3) \begin{aligned} y &= 2x^{3/2} - 1 \\ y' &= 3x^{1/2} \end{aligned} \quad \text{Length} = \int_0^1 \sqrt{1 + (3x^{1/2})^2} dx = \boxed{2.268}$$

$$4) \begin{aligned} g(x) &= x^{3/2} \\ g'(x) &= \frac{3}{2} x^{1/2} \end{aligned} \quad \text{Length} = \int_0^1 \sqrt{1 + \left(\frac{3}{2} x^{1/2}\right)^2} dx = \boxed{1.440}$$

$$5) \begin{aligned} y &= \frac{2}{3} (x^2 + 1)^{3/2} \\ y' &= 1(x^2 + 1)^{1/2} (2x) \end{aligned} \quad \text{Length} = \int_1^4 \sqrt{1 + ((x^2 + 1)^{1/2} (2x))^2} dx = 45$$

$$6) \int_1^3 ((x^2 - 8x + 10) - (\frac{1}{2}x^2 - 2x - 1)) dx \quad \text{Area} = \boxed{11}$$

$$7) \int_0^2 \left( -x^2 + 4x - \left( \frac{-x^3}{2} + 2x^2 \right) \right) dx + \int_2^4 \left( \frac{-x^3}{2} + 2x^2 - (-x^2 + 4x) \right) dx = \boxed{4}$$

$$8) \int_{-1}^7 \left( 3 - \left( \frac{x^2}{2} - 3x - \frac{1}{2} \right) \right) dx \quad \text{Area} = \boxed{\frac{128}{3}}$$